

— An Inaugural Dissertation —
on
Animal Life.

Submitted to the examination
of
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the
Trustees and Medical Faculty
of the
University of Pennsylvania

For the Degree

Doctor of Medicine

by
Walter Channing

of
Boston, Massachusetts.

Honorary member of the Philadelphia
Medical Society, &c. —

— April 1809. —



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On Animal Life. —

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The following pages contain some remarks on Animal Life. I have ventured on this subject, not from mere opposition to the generally received sentiment concerning it. Veneration, & affection equally incline me to the contrary. But systems challenge investigation; and the good sense of their projectors reconciles them even to the severity of criticism. This last task is not the duty of a young man. Mine shall be only to express the difficulties which present themselves to me, even when endeavouring to coincide with those, whose study & talents

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on the one hand have tried to decide, and
whose decisions are, & had almost said, conse-
crated by time on the other. —

Life has been considered an Effect. That
it is one, no rational being can deny. Crea-
tion in its utmost extent is an effect. God
spoke and there was light, & life.

But Animal Life, that which presents us
with such wonderful phenomena, on which
man depends as a condition for making
known to his fellow creatures the intricate
windings of abstract speculation; on the
possession of which alone he is enabled to
investigate the secrets of nature, on which in-
deed the final cause of his existence entirely
depends is considered the Effect of secondary

[Faint, illegible handwriting on the left page of an open manuscript. The text appears to be a continuous paragraph or a series of connected thoughts, but the ink is too light to transcribe accurately.]

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causes. I respect, I revere the authors of the
system, and anticipate their pardon for my
presumption for withholding my assent to
it. — — —

An Effect causis paribus, must
always result from the existence of a cause,
which ever has been attended with a simi-
lar effect. — Barbaque has thought and
perhaps with much propriety, that a cause
to be such, ~~exists~~ or is necessarily attended
with its effect, that ~~they~~ they are simultane-
neous, ^{a subsequent} — & the two words cause and effect
result from that weakness of our understand-
ing which can view ~~things~~ ideas & occur-
rences ^{only} in succession. That it is not what
will be, but what really is, ~~follows~~ fol-
lowed by a particular result, that is

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Because. Now one of the causes or stimuli of life is air. A ~~common~~ question now naturally presents itself. If life has ever been the result of this stimulus, why are we not able by the same means to reanimate a lifeless body? why do we not breathe and bid the phenomena of life appear? —

It is answered that a capacity is absolutely necessary for the effects of the stimulus to appear which uniformly have appeared when that capacity existed it, these stimuli have been prevented. What are we to understand by this capacity? On the new theory it can only mean a certain condition of some parts of the system calculated to be acted on, by certain stimuli,

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in the action of which certain effects shall
be produced in those parts which shall
become causes, productive of other effects,
viz, the wonderful phenomena resulting
from the operations of the human economy.

But is this the case? If the atmosphere
correct, does not the failure of experiments
instituted for the recovery of those suffocating
under asphyxia for instance, ^{lead us to} doubt
the assertion that air is the cause or
stimulus of life? Further in order
that air should become a stimulus of
life, it must enter the lungs. The
lungs must have been originally prepa-
red for its reception, If they were a
vacuum, by a law imposed on air, it

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must have necessarily entailed them, and the phenomena of life must have followed. Had the human beings been constructed as I have supposed, there could have been no natural necessity, for ~~the~~ ^{our} ~~the~~ ^{our} natural interposition of the Deity in the production of the Life of man.

Life and its wonderful effects and all the attributes of the vast range of the brute creation, long before the creation of man, and the subjects of it were prepared to state themselves before this last best work of the Deity. - Could contractility, irritability, sensibility, the circulation of the blood, which is consolidated by rest, could animal heat, finally

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be the accidental result of one lifeless, in-
 stantaneous? we are told that God breathed
 into man. By this, surely, means the entrance
 of air into the lungs, what ~~would~~ occur
 thing to the nature of things would have been
 the result? The lungs which before were
 either a perfect natural vacuum, or naturally
 compressed, not possessing any preponderance
 from other matter, must necessarily, have
 been left in the same situation with matter
 in general. the equilibrium being restored,
 nothing farther could take place, that
 this is not the case, by the expansion
 of the air vessel, of the lungs, the blood ~~vessels~~
 vessels become permeable, the blood leaves the
 vessel, the air, &c, enters the expanded

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Lungs, recovers the heart, and thence commences its wonderful circulation, dispensing Life, Heat, and vigor through the most minute portions of the system. —

But is there not something more necessary, — the mere entrance of the air into the Lungs, that the phenomena of respiration — i. e. ~~aspiration~~ take place

I conceive there is. Muscular motion is a phenomenon as striking as respiration; in fact respiration depends on is the result of it; ~~aspiration~~ must be effected; which can only be effected by the peculiar properties of the muscular Fibre. From whence is this peculiarity of muscle derived? Muscles are the purposes of —

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voluntary motion, are under the influence
of stimuli when separated from the
body. But what does the motions of mus-
cles not dependant on the will depend?
On a connection with a part of the sys-
tem essentially different from any other
part as to structure, insensible ~~to~~
the seat of sensibility, destitute
of contractility though the source of this and
other functions of the body. This ^{in connection with which it must be the} ~~same~~
portion of the system is the Brain
From whence did the Brain, derive such
peculiar properties? Surely, not from stim-
uli, for before the system can be susceptible
of the action or impression of stimuli, before
the necessary, appropriate effects can

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result a brain is necessary. & a connection of each part of the body, which is destined to the performance of any function, must exist between such part and the Brain. —

No stimulus can act on the brain through the medium of other parts, unless their susceptibility of such action, or power of action, has previously been derived from the Brain. —

That the power, or property, very little so peculiar to animal nature is intelligent I do not even imagine. But that it is one which distinguishes it from all other kinds of matter or spiritless substances, whose peculiarities are the ^{results of} accidental or mechanical arrangement, I do not hesitate to believe. It is a power or principle, but like all other in nature it acts necessarily. —

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in its perfection it appears to be a
 "how" by the energy of which various species of mat-
 ter are converted to one kind under one system
 system, so that the matter thus converted has
 the power of resisting the operation of external
 causes & of preserving itself from decomposi-
 tion and decay. And thus, essentially, this
 being, from common matter, it is a power
 constantly exerting itself for the nourishment
 & defence of the subject in which it resides,
 it is a quality which renders the subject
 of it specifically different from all known
 matter. The belief that life is an ag-
 gregate is, founded on the definition, that
 some have given it viz that it is an
 aggregate of all the actions or motions of
 the animal mechanism, which result

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from the impression of stimuli on an aptitude in the system to a desire on, called also excitation. This entire system of life is said to be a poised state. Now, as long as an aptitude of this kind forms the phenomenon of life must appear; whenever causes are applied calculated to produce such effects. But we find this not to be the case. Innumerable instances of suspended animation where the process of decomposition could not have taken place, are on record in which the benevolence of humanity has prompted to the noblest exertions to restore the animal functions without success. Further, on the new theory, the aptitude for life is in a di-

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direct ratio to the abstraction of stimuli;
 but universal experience testifies that
 resuscitation is difficult in proportion to
 the period length of the time of suspended
 animation, so that the cause of increased
 aptitude for life is the most certain in
 cause of its destruction. —

This aptitude must, I conceive, be
 the result of some peculiarity of arrange-
 ment of matter as it respects its arrange-
 ment, It has been asserted to be such.
 The affinity of matter with matter, has
 been considered the cause, the sole cause
 of the adaptation of animal matter for the
 action of stimuli or causes producing
 life. Some other doctrine, theories have

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arise as wild as those which the imaginations
of a Paracelsus framed; and perhaps as offensive
to the Deity. I pass them by in silence.

I hope I shall be permitted to dwell
on the doctrine. When I enter on the sub-
ject of the Oxygenous Philosophy, I feel
that I am entering on one consecrated
by the best talents of the greatest men.

I find enrolled in its defence not only
names the subjects of which have mouldered
away, but likewise of those, who live the
objects of my respect and regard. Their
opinions are founded on a science which
should be, & is, among the noblest employ-
ment of the Physician. It has placed in
his hands instruments, yes weapons by
which he prostrates disease at his feet.

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I anticipate, pardon, if warmth should ex-
 ceed ability; I hope for it if respect for
 opinion should give place to the investigation
 of system. — Granting that posita-positi-
tion, the effect of affinity, is the circumstance
 which distinguishes animal matter from all
 other matter. This affinity must be under the
 influence of certain Laws — I rather write
 a certain sphere only can it act; only
 on certain objects — I cannot conceive of
 it as
 acting on all things, principle, in the
 then account for the results which take place
 from animal processes. Can it allow for the
 power of generation which animal matter
 possesses? Is it by this that man becomes
 the inhabitant of every climate, or is it
 believed that it adapts itself not to cir-
 cumstances though it be admitted to be under

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The influence of Laws. — By the fusion of animal life matter the most heterogeneous are converted into one possessing exactly the same sensible qualities, & exhibiting the same by chemical analysis. — One and the same law, limited & unchangeable, under circumstances the most opposite is asserted to be the cause of uniformly the same effects: —

The affinity of Oxygen with the animal fibre is assumed as the cause of that peculiarity, by which the different parts of the structure ^{are excited} are enabled to perform their several functions. — But how on this doctrine can we account for the peculiarities of the ^{animal} vital state of existence? — This presents us with growth, this is the effect of nourishment. — Nourishment is the effect of assimilating powers, & these of structure.

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intricate almost beyond explanation. Possessing with all the preservative power as perfectly as the adult. We will consider the foetus as perfect in its parts. Now, from whence does the little animal derive its powers of vitality, contractility, and its actual motion? It is answered, From the affinity between oxygen and the animal fluid, there results a combination ^{from which results a} ~~fixed~~ ^{invariable} effect ~~which~~ ^{as follows}—
 such peculiar effects, to be produced.

But through what medium is this combination effected? How are these external objects brought within the sphere of their reflective attraction, or affinity? Through the medium of circulating blood. Blood deriving its oxygen from the atmosphere, ~~the~~ ^{the} being taken into the lungs of

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the mother, and then conveyed to the father by a direct connection of the uterus with the mother?

No. A direct communication has never been
demanded. Any objections, raised directly & directly
from the spiritual interests to the spiritual
religion. No vessel constituting a connection
between the material & the spiritual. As
well as. * -

The following case will show how completely the facts are in
agreement between the mother & father. Mr Shelley & myself
were this winter engaged in an obstetric case. It was a foot
~~long~~ presentation, the child was Asphyctic of respiration
for several hours before it came to delivery, inflation of the
lungs was practiced frequently during the last 15 min-
utes, when the placenta being delivered, that with the
child was removed to a tub & warm water in 45 min-
or more the phenomena of life began to appear -
The chord exhibited the usual appearance of venous
I incised it close at the place of division -
the difference in the nature of the blood from the adult blood is
however, the difference in the pulsation of the ^{arteries} of the fetus
its mother is admitted by all.

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Before this was found to be the true state of things, in experiment, the system we are now considering might have had some degree of plausibility even such a connection being supposed really to exist. But these facts being known a serious difficulty presented itself to J. Bell, the celebrated Anatomist & Surgeon of London. He found that oxygen could not through the medium of the blood enter the fetal system. — To remove this, he avails himself of a petite principe, asserting that there is a something secreted by the uterus which enters the placenta and brings along with it the oxygen in a concrete form. I would now ask how can oxygen acquire this form? Does it, in the uterine circulation, meet with parts, which are destitute of caloric

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to which it yields that which it is supposed
 to possess, & thus become concrete? If we
 had not suppose the oxygen enters the uterus
 in a gaseous form but only by its connection
 with the mass of the blood, produced by
 its previous union with the Phosphorus
 it meets with in the blood forming with
 it an acid, & that with the iron forming
 a salt. In what chemical process can
 we suppose it to reach loose from
 matter with which its affinity has so close
 connection ^{for all the circumstances the circumstances are revised} ^{concrete} to assume a gaseous
 form; combine with a portion of the uterus
 which, perhaps, does not exist, then leave
 that and finally enter the placenta, &
 thus accommodated enter the circulating
 system of the fetus. —

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That oxygen pressure, when taken up in the blood
 we can easily supply. The respiratory system gives
 more blood to a fine blood vessel, that it
 effect an animal maintenance, being dependent of the oxygen
 and of the life without it will, on some other
 from a source. But it is not a simple principle.

To however take their color while under
 the same influence. It however has its of
 its own nature, a matter, & that it, but
 cannot, for it acts only as circumstances, favor
 able to such action are present. We can
 bring the animal into a demand, & a system
 for air possessing oxygen. A cut respi-
 ration, and without any known medium for
 the passage of oxygen into its system, the fishes
 and the water, & the air, & the water.

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the same colour with that which is seen in it,
under the influence of oxygenated air. The fact
without any communication with oxygen the fact
presents no such a circumstance ~~which~~ which must
lead us to suppose if oxygen have the effects
ascribed to it, that it (i.e. the fetus) receives
however a larger portion of oxygen than the adult.
We all know that the venous blood from the head
and superior extremities ^{intended} mixes intimately with
the blood received from the umbilical vein &
in this state the whole mass is circulated
over the whole system, the quantity of blood from
these parts is admitted to be large, but
the whole mass appears as briefly arterial as
it respects colour as that of the adult. Now
unless it be extremely pure it must act as
a stimulus being a foreign body, this stimulus
acting on the accumulated excitability of the
fetus, in such a manner to be the case.

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A Degree of excitement the effect of, stimulus acting
on excitability; must follow constantly without
any variation or ^{even} prior organization. — That of
the large ^{portion} of oxygen which the fetus receives is in-
tended to remedy the effect, which must follow
from the ^{intra} uterine ^{circulation} of ^{poor} arterial blood,
the measure of excitement cannot take place
But I presume from the views given of the fetus
as to respects the influence of oxygen on it,
that neither of these theories will be considered
for

I have now concluded my remarks on
Animal Life. I have not considered at the self
originated power of some, nor the intelligent
Receptive principle of others. I have only expressed
the difficulties which present themselves when
considering it as an effect. I leave to the projector
of that theory as men claim the respect, I ad-
miration of the world, for they must be viewed as
the benefactors of mankind. The sciences;

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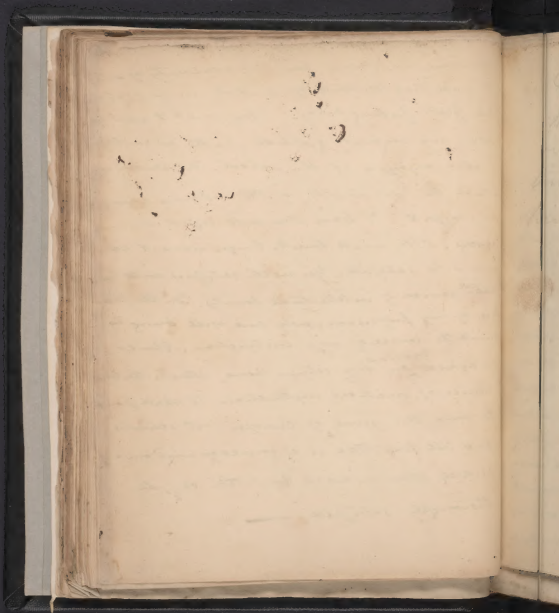
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Medicine has gained from the uncertainty of which
 it was long destitute of, and its imperfections
 are fast fading away. Here would I now ex-
 -press my sincere gratitude, for the advantages
 I have enjoyed at this school. Advantages,
 which, the best talents, of the best men can
 only afford. I leave them with regret the most
 sincere. The mind loves to linger where it can
 ask & be satisfied. Yes, richly satisfied with from
 such sources of intellectual bounty. In the prac-
 tice of my profession, every cure will bring to
 mind the sources of my instruction. Should I
 be asked ^{by any one} on my return home, where is the best
 source of medical instruction. I shall point
 to him this rival of Europe's best schools,
 and tell him there is a source of wisdom and
 science where medical Ambition can be
 thoroughly satisfied. —



D^r Barton will please give
this to Dr. Weston when he de-
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and taken of one of my
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Conception

Hardy H. Lovins

1810 - no 27

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